

**METHOD AND APPARATUS PROVIDING AN ADVANCED MIMO
RECEIVER THAT INCLUDES A SIGNAL-PLUS-RESIDUAL-
INTERFERENCE (SPRI) DETECTOR**

ABSTRACT OF THE DISCLOSURE

A method is disclosed to obtain M final symbol decisions for signals received through N receive antennas that were transmitted in M parallel data layers, using a same spreading code from M transmit antennas. The method includes space-time equalizing the N received signals to generate M output signals from which at least inter-symbol interference is substantially removed and inter-layer interference is suppressed; despreading each of the M output signals for generating M soft symbol estimates; and processing the M soft symbol estimates to derive M final symbol decisions that are made in consideration of modeled residual inter-layer interference present in the space-time equalized M output signals. Processing includes operating a signal-plus-residual-interference (SPRI) detector that operates in accordance with a maximum likelihood (ML) technique, while space-time equalizing employs a linear minimum mean-square error (LMMSE) criterion. Transmitting may occur at a base station having the M transmit antennas, and receiving may occur at a mobile station having the N receive antennas.